

3. Reducing Emissions from Energy End Use and Transportation

Reducing Energy Demand at Stationary Sources

Energy use at stationary sources in the residential, commercial, and industrial sectors accounted for 3.8 billion metric tons of carbon dioxide emissions in 2000—two-thirds of U.S. carbon dioxide emissions. Emissions from stationary-source energy use included 2.4 billion metric tons of carbon dioxide from the generation of electricity that was ultimately consumed in these three sectors. Industry was the largest of the three sectors in terms of stationary-source emissions, accounting for nearly half the total (45 percent); the residential sector accounted for about 30 percent of the total energy-related emissions from stationary sources; and the commercial sector accounted for the remaining 25 percent.²⁶

Between 1990 and 2000, carbon dioxide emissions associated with industrial, residential, and commercial energy use increased by 13.8 percent. The commercial sector is the fastest-growing emissions source, registering a 27.4-percent increase in emissions between 1990 and 2000. Emissions from the residential sector increased by 21.9 percent over the same period, and industrial sector emissions rose by 2.9 percent.²⁷

Projects Reported

Ninety-one entities reported energy end-use projects in 2000. Most (68) were electric power providers. The other reporters included households; industrial companies, dominated by cement plants (Arizona Portland Cement Co., Calaveras Cement Co., two plants associated with California Portland Cement, and Lehigh Portland Cement Co.); chemical products companies (Allergan, Inc., Johnson & Johnson, Mead Johnson Nutritionals/Bristol-Meyers Squibb, and Pharmacia & Upjohn); and transportation equipment companies (General Motors, Pratt & Whitney North Berwick, and Rolls-Royce Corporation). These 91 entities reported 424 energy end-use projects in 2000, involving reductions in end-use demand for energy or fuel switching. Energy end-use projects accounted for 23 percent of all projects reported to the Voluntary Reporting of Greenhouse Gases Program for 2000, ranking third behind sequestration (26 percent) and electricity supply (25 percent) in the number of projects reported.

Although the number of entities reporting energy end-use projects in 2000 was 9 fewer than the 100 that reported for the 1999 data cycle (Table 10), the number of energy end-use projects reported for 2000 was 37 more

Table 10. Number of Energy End-Use Reporters, Projects, and Emission Reductions Reported, Data Years 1994-2000

Data Year	Number of Reporters	Number of Projects Reported	Emission Reductions Reported (Metric Tons Carbon Dioxide Equivalent)		
			Direct	Indirect	Unspecified ^a
1994	75	204	9,103,753	1,318,092	1,361,188
1995	90	271	12,450,879	1,591,590	1,573,674
1996	85	267	15,288,497	1,538,196	1,910,306
1997	92	309	16,685,010	3,798,030	2,353,454
1998	107	374	18,282,751	5,026,424	2,393,956
1999	100	387	16,047,912	6,786,832	334,120
2000	91	424	19,633,680	8,137,090	358,568

^aUnspecified reductions represent quantities reported on Form EIA-1605EZ, which does not distinguish between direct and indirect emission reductions.

Note: More than one project type may be assigned to a single project; therefore, the sums of the projects and reductions in each project type category may exceed the total numbers of projects and reductions in the totals and subtotals.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

²⁶In terms of their contribution to total energy-related carbon dioxide emissions in 2000, the industrial sector led with a 30-percent share of the total, followed by the residential sector (20 percent) and the commercial sector (17 percent). Transportation, which is considered in the next section of this chapter, accounted for the remaining 33 percent.

²⁷Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2000*, DOE/EIA-0573(2000) (Washington, DC, November 2001), pp. 19-32, web site <http://www.eia.doe.gov/oiaf/1605/1605a.html>.

than the 387 reported for 1999. Corresponding to the increased number of energy end-use projects reported for 2000 were increases in the total reported direct, indirect, and unspecified emission reductions resulting from energy end-use projects (increases of 22 percent, 20 percent, and 7 percent, respectively). The large drop in unspecified emission reductions shown in Table 10 between 1998 and 1999 resulted from a change in the status of one reporter on Form EIA-1605EZ, Pacific Gas and Electric (PG&E) Company. PG&E Company is a subsidiary of PG&E Corporation, which reported on the short form for data years 1994 through 1998. In 1999, PG&E Corporation consolidated data from two subsidiary companies reporting to the Program into a single report, which was filed under its own name on Form EIA-1605. (The second subsidiary company previously filed under the name USGen New England, Inc.).

Emission reductions reported for individual energy end-use projects ranged from less than 1 metric ton to almost 3 million metric tons, primarily because of the flexibility allowed in defining the scope of a project. Projects could range from the installation of a compact fluorescent light bulb reported by a household to a system-wide demand-side management (DSM) program reported by a large electric utility. Among projects for which direct emission reductions were reported, 82 percent had emission reductions of less than 100,000 metric tons carbon dioxide equivalent (Figure 8). Similarly, reported emission reductions totaled less than 100,000 metric tons carbon dioxide equivalent for 94 percent of the projects in which indirect reductions were reported and for 98 percent of the projects reported on Form EIA-1605EZ, which does not distinguish between direct and indirect reductions. Thirty-nine end-use projects reported emission reductions between 100,000 and 1 million metric tons carbon dioxide equivalent (one less than the number for the 1999 reporting cycle), and seven end-use projects reported reductions in excess of 1 million metric tons each (two more than for 1999).

New Projects and New Reporters

New projects reported to the Voluntary Reporting of Greenhouse Gases Program are not limited to activities initiated in 2000. A project may be considered new to the program for either of two reasons: it may have begun in the current data year (“newly operational”), or it may be an ongoing project not previously reported (“newly reported”). In all, 96 new energy end-use projects were reported by 20 separate entities for the 2000 reporting cycle. Only one of the entities had never before reported to the program.

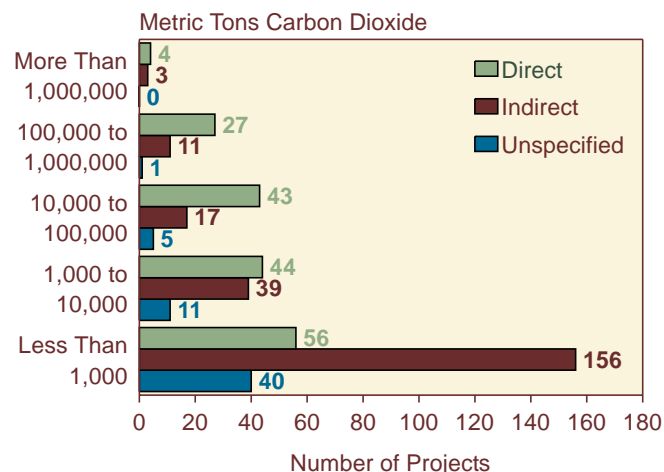
Of all the new energy end-use project, 33 became operational in 2000 (reported by 10 entities, all of which had reported previously), as compared with 37 in 1999—an 11-percent decrease in the number of newly operational

projects. Lucent Technologies accounted for the largest individual portion of newly operational projects in 2000 (55 percent), reporting 18 projects involving equipment and appliances, HVAC, lighting, and building shell improvements. Also of note was the presence of 13 newly operational chiller (air conditioning) upgrade or replacement projects, 9 of which were undertaken by Lucent Technologies. These 13 projects compose 39 percent of all newly operational energy end-use projects and 50 percent of Lucent’s newly operational projects.

One of the newly operational projects was an undertaking by Platte River Power Authority and four owner cities. In 2000, the City of Longmont began a Traffic Signal LED project to replace conventional incandescent stop-light bulbs with more efficient light-emitting diodes (LEDs). Longmont plans to install LEDs in all “new-build” intersections and to retrofit three to four existing intersections each year. Standard red lamps at older intersections use 135-watt incandescent bulbs, which are being replaced with more efficient 15-watt LEDs, producing a savings of 120 watts each. With the red duty cycle averaging 49 percent of the time, each LED produces per-lamp savings of 515.1 kilowatthours per year. The higher lamp costs for LEDs are offset over time by energy savings, reduced peak-load demand, and the need for fewer lamp replacements. Substitutions are also being made for green and yellow lamps.

In addition to the 33 newly operational projects, 63 newly reported projects were reported by 13 entities. Forty-two of the newly reported projects were reported by 5 existing reporters, and, as mentioned before, there was one new reporter. This reporter, Mead Johnson

Figure 8. Reported Energy End-Use Projects by Size and Type of Emission Reduction, Data Year 2000



Note: Unspecified reductions represent quantities reported on Form EIA-1605EZ, which does not distinguish between direct and indirect emission reductions.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

Nutritionals/Bristol-Myers Squibb reported 2 projects. Seventeen of the newly reported projects were reported using Form EIA-1605EZ by six different entities. One newly reported project was submitted by Xcel Energy, which had never before reported to the program but is not considered a new reporting entity because it was formed in August 2000 through the merger of a previous reporter, Northern States Power Co., and Denver-based New Century Energies. All but one of the Xcel Energy end-use projects had been reported previously by Northern States Power Co.

Reported direct emission reductions resulting from all 93 new energy end-use projects totaled 95,681 metric tons carbon dioxide equivalent. Indirect emission reductions resulting from the new energy end-use projects totaled 141,766 metric tons carbon dioxide equivalent. Unspecified emission reductions resulting from the new energy end-use projects reported on Form EIA-1605EZ totaled 3,300 metric tons carbon dioxide equivalent during the 2000 data cycle.

Project Types

Of the reported energy end-use projects (Table 11), 27 percent listed involvement with two or more project types. For example, a single DSM program reported by an electric utility can incorporate multiple types of energy end-use activities, such as lighting and equipment. Several electric utilities combine all the DSM programs in their service territories into single projects, whose direct emission reductions tend to be higher than most single-type projects.²⁸ For this reason, project totals and emission reductions in Table 11 do not equal the sum of their components since the reductions for many projects are recorded in more than one project type category.

Overall, the most frequently reported type of energy end-use project, for the seventh year in a row, was lighting and lighting controls (181 projects), followed by equipment and appliances (162 projects) and heating, ventilation, and air conditioning (HVAC) (129 projects). For projects involving lighting and lighting controls in

Table 11. Number of Projects and Emission Reductions Reported for Energy End-Use Projects by Project Type, Data Year 2000

Project Type	Number of Projects Reported	Number of Projects Reporting Emission Reductions				Emission Reductions Reported (Million Metric Tons Carbon Dioxide Equivalent)		
		Direct	Indirect	Both Direct and Indirect	Unspecified ^a	Direct	Indirect	Unspecified ^a
Lighting/Lighting Controls	181	73	100	9	16	16.3	6.2	*
Equipment/Appliances	162	82	90	18	7	15.2	6.7	*
HVAC	129	71	60	11	9	15.8	5.9	0.1
Load Control	65	41	29	10	5	12.5	3.4	*
Building Shell	65	43	29	8	1	14.5	4.2	*
Motor/Motor Drive	61	40	29	9	1	13.2	4.8	*
Fuel Switching	25	16	10	8	6	5.0	1.2	*
General Energy Use ^b	13	—	—	—	12	—	—	0.2
Energy Effects of Urban Forestry . .	8	7	3	2	—	3.6	*	—
Industrial Power Systems	7	5	2	—	—	0.4	0.4	—
Other ^c	27	19	13	6	—	1.5	0.4	—
Total	424	175	227	36	57	19.6	8.1	0.4

^aUnspecified reductions represent quantities reported on Form EIA-1605EZ, which does not distinguish between direct and indirect emission reductions.

^bIncludes projects reported on Form EIA-1605EZ that encompass more than one project type. Because Form EIA-1605 allows reporters to identify multiple project types encompassed by a project, the General End Use category is specific to Form EIA-1605EZ reporting.

^cIncludes all projects that cannot meaningfully be included in any of the specific project type categories.

*Less than 0.05 million metric tons.

Note: Project totals and emission reductions do not equal sum of components, because some projects are counted in more than one category.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

²⁸Reporters of direct reductions are predominantly electricity generators whereas reporters of indirect reductions are predominantly consumers of electricity generated by electric utilities.

2000, the total direct emission reductions reported were 16 million metric tons carbon dioxide equivalent. The other energy end-use categories that yielded total reported direct reductions in excess of 10 million metric tons carbon dioxide equivalent were equipment and appliances, HVAC, load control, building shell improvement, and motor and motor drives. The eight projects reported in the category of urban forestry reduced direct emissions by an average of 512,303 metric tons carbon dioxide equivalent, more than 4 times the average reduction for all energy end-use projects (112,192 metric tons).

Energy end-use projects can be carried out anywhere energy is consumed. For this report, energy end-use projects are categorized as occurring in the industrial, commercial, residential, and agricultural sectors. End-use projects reported for 2000 in the industrial sector (230) outnumbered those in the residential (130) and commercial (120) sectors, which, in turn, greatly outnumbered agricultural sector projects (21) (Figure 9). Fewer projects were reported in 2000 for the commercial and agricultural sectors than were reported for the 1999 data year, down by 1 project and 1 project, respectively. In contrast, 5 more end-use projects were reported for the residential sector and 39 more were reported for the industrial sector, which showed the largest increase. It

should be noted that many projects—particularly utility DSM programs—cover more than one end-use sector and are included in each applicable sector for the purposes of counting types of projects reported.

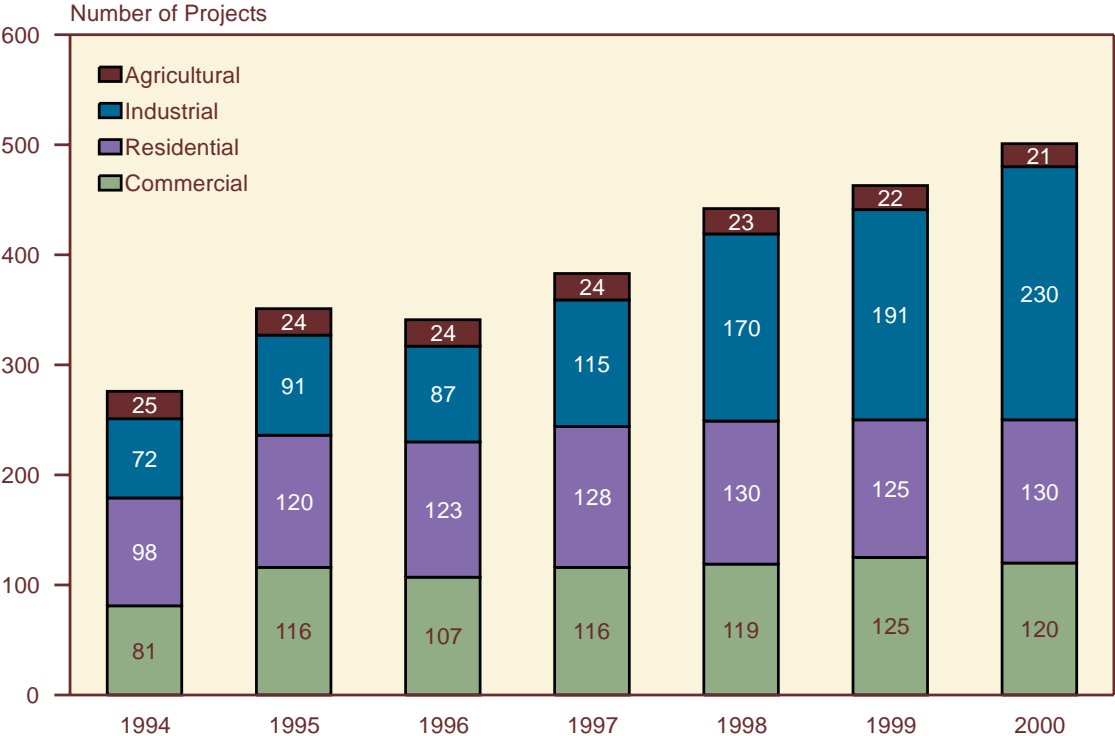
Although the most common load shape objective of reported DSM projects was increased energy efficiency (339 projects), electric utilities also attempted to balance their load profiles with various other load shape objectives (see box on page 35). Peak clipping (69 projects) was the second most common load shape objective reported, followed by load shifting (38 projects), valley filling (19 projects), and load building (13 projects) (Figure 10).

Reducing Transportation Fuel Use

Overview

The transportation sector is the largest contributing sector to the total U.S. emissions of carbon dioxide, accounting for 33 percent of emissions in 2000. These emissions result from the combustion of fossil fuels, with petroleum fuels accounting for 98 percent of these emissions. Emissions from this sector increased by 19 percent

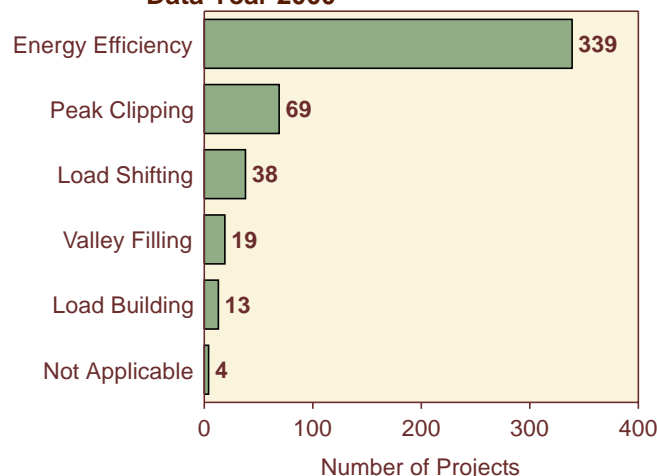
Figure 9. Reported Energy End-Use Projects by Sector, Data Years 1994-2000



Notes: Excludes energy end-use projects reported on Form EIA-1605EZ. Some projects target more than one sector and may be counted in multiple categories.
Source: Energy Information Administration, Form EIA-1605.

between 1990 and 2000, from 1,583 million metric tons of carbon dioxide to 1,888 million metric tons of carbon dioxide.²⁹ This increase was caused by increases in both the average number of miles driven per vehicle and the total number of vehicles on the road. The average number of miles driven by motor vehicles increased by 9.9

Figure 10. Reported Demand-Side Management Projects by Load Shape Objective, Data Year 2000



Notes: Excludes demand-side management projects reported on Form EIA-1605EZ. Some projects may be counted in more than one category.

Source: Energy Information Administration, Form EIA-1605.

percent between 1990 and 1999³⁰ and the number of vehicles on the road increased by 11.6 percent between 1990 and 1998.³¹ Although emissions were extenuated somewhat by an increase in average U.S. vehicle fleet fuel efficiency from 16.4 miles per gallon to 16.8 miles per gallon between 1990 and 1999, this trend has been reversed since 1997 when fuel efficiency peaked at 17.0 miles per gallon.³²

A total of 72 transportation projects were reported for 2000 by 41 entities, all but 5 of which were electric utilities. One of the nonutilities was CLE Resources, a sub-sidiary of an electric utility. The 4 others were a printing company (Quad/Graphics, Inc.), a cement producer (Arizona Portland Cement Co.), a fabricated metals company (Majestic Metals, Inc.), and a household. Detailed information was provided for 61 (85 percent) of the projects on Form EIA-1605. Summary information for the remaining 11 projects was reported on Form EIA-1605EZ. All but 3 of the 72 projects have been reported in previous years. The new projects were various travel reduction initiatives reported by Baltimore Gas and Electric Company, a car-pooling project reported by Arizona Electric Power Cooperative, and an alternative-fuel vehicle (AFV) project reported by PECO Energy Company. Forty-five (63 percent) of the projects reported for 2000 were affiliated with the Climate Challenge program.

Load Shape Effects: Definitions and Terminology

Energy Efficiency. Projects that improve the energy efficiency of specific end-use devices and systems. Such projects usually reduce overall energy consumption, often without regard for the timing of project-induced savings. Generally, energy savings are achieved through the substitution of technically more efficient measures (i.e., equipment, systems, or operating procedures) to produce the same level of end-use service (e.g., lighting or warmth) with less energy use.

Load Building. Projects that increase energy consumption, generally without regard to the timing of the increase. Promotion of residential electric space heating systems and promotion of new industrial electrotechnologies are examples of electricity load-building projects.

Load Shifting. Projects that move energy consumption from one time to another (usually during a single day). For example, water-heater timers typically turn off the

units during the daytime (when an electric utility experiences peak demands) and allow the units to operate at night (during the utility's off-peak period).

Peak Clipping. Projects that reduce energy demand at certain critical times, typically when the utility experiences system peaks. These projects generally have only small effects on overall energy use but focus sharply on reducing energy use at critical times. Load-shifting and peak-clipping differ because the former shifts much of the energy use from one time to another, whereas the latter eliminates a load without shifting it to another time period.

Valley Filling. Projects that increase off-peak energy consumption (without necessarily reducing on-peak demands). Replacement of a natural-gas-fired furnace with an electric heat pump (with backup heat provided by natural gas) is an example of valley filling. Such projects can aim to fill daily or seasonal valleys.

²⁹Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2000*, DOE/EIA-0573(2000) (Washington, DC, November 2001), p. 28, web site <http://www.eia.doe.gov/oiaf/1605/1605a.html>.

³⁰Energy Information Administration, *Annual Energy Review 2000*, DOE/EIA-0384(2000) (Washington, DC, August 2001), p. 57.

³¹U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2000*, BTS01-01 (Washington, DC, April 2001), Table 1-9, web site http://www.bts.gov/btsprod/nts/Ch1_web/1-9.htm.

³²Energy Information Administration, *Annual Energy Review 2000*, DOE/EIA-0384(2000) (Washington, DC, August 2001), p. 57.

Tables 12 and 13 show transportation project trends in the first seven reporting cycles of the Voluntary Reporting Program. The projects reported for 2000 fall into three broad categories:³³

- Alternative fuel use (32 projects or 44 percent)
- Travel reduction (34 projects or 47 percent)
- Vehicle efficiency improvements (8 projects or 11 percent).

The primary effect of the transportation projects reported was to reduce emissions of carbon dioxide, although reductions in emissions of nitrous oxide or methane were also reported for 6 projects. For 11 of the

72 projects reported, either reductions did not occur in 2000 or they were not estimated.³⁴

Direct reductions totaling 21,911 metric tons carbon dioxide equivalent were reported for 32 projects in 2000 (Table 12). This represents a significant decline from the 43,499 metric tons carbon dioxide equivalent in direct reductions reported for 1999, primarily as a result of changes in two projects. The direct reductions for PG&E Corporation's natural gas vehicle project declined from 18,351 metric tons carbon dioxide in 1999 to 5,091 metric tons carbon dioxide in 2000. Commonwealth Edison Company (formerly UNICOM) did not report reductions associated with aluminum coal-carrying rail cars

Coal Ash Reuse Projects

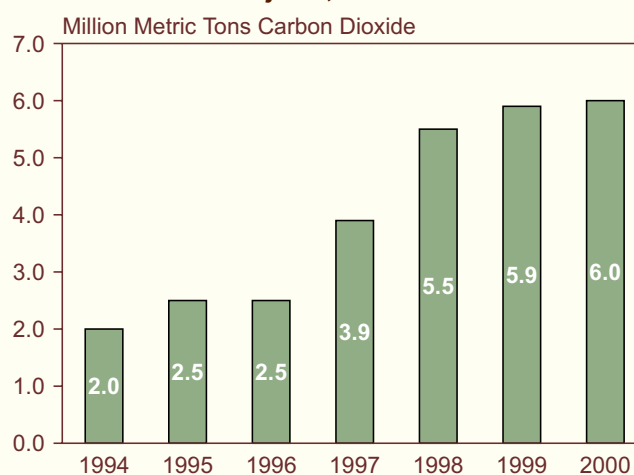
Coal ash, a byproduct of coal combustion, is a marketable commodity for the electric power sector, which accounts for 92 percent of coal use in the United States.^a The most common use of coal ash is as a replacement for Portland cement in the manufacture of concrete, and reductions in carbon dioxide emissions are achieved by reducing emissions from the calcination process. Electric utilities sell coal ash produced at their facilities to avoid landfill disposal costs and to meet increasing demand for the commodity.

In 2000, the total number of entities reporting coal ash reuse projects (39) increased slightly from the 38 entities reporting such projects in 1999. There was a corresponding increase in the total number of projects reported for 2000 (45), up from 41 reported for 1999. The total carbon dioxide emission reductions reported increased by 1 percent, to 5.1 million metric tons (see figure). The combined indirect emission reductions reported for coal ash reuse projects in 2000 accounted for 13 percent of the indirect carbon dioxide emission reductions reported for all projects. Just over 7.7 million metric tons of coal ash was reported to have been reused in 2000, primarily as a substitute for Portland cement in concrete manufacturing. A small assortment of reporters indicated that fly ash was reused in materials including road base, anti-skid material, or structural fill; however, emission reductions from these applications were not quantified. The largest reductions from coal ash reuse were reported by TXU (over 600,000 metric tons), by American Electric Power (over 500,000 metric tons), and by PacifiCorp (over 500,000 metric tons).

^aEnergy Information Administration, *Annual Energy Review 2000*, DOE/EIA-0384(2000) (Washington, DC, August 2001), p. 202.

Reporters used different emission coefficients to estimate their carbon dioxide reductions for cement substitution, ranging from 0.8 to 1.0 metric ton per ton of coal ash reused. The coefficients varied depending on the fuel used to fire the kilns, the proportion of coal ash used in cement, and the electricity used to grind raw materials used for the displaced cement. Other coefficients were derived from the ratio of the molecular weights of carbon dioxide and calcium oxide (the chemical compounds involved in the calcination of limestone) and the ratio of the specific gravities of coal ash and cement.

Reported Indirect Emission Reductions from Coal Ash Reuse Projects, Data Years 1994-2000



Source: Energy Information Administration, Form EIA-1605EZ.

³³The sum of projects in each category exceeds the total number of projects because some projects are counted in more than one category.

³⁴In some cases, reductions for the project may have been reported for years prior to 2000. In other cases, the reductions were not estimated due to the lack of data or other difficulties in quantifying the effects of the project. Entities may elect to report projects without reporting reductions to make a public record of the fact that they have conducted an activity in fulfillment of a commitment made under a voluntary program such as Climate Challenge.

in 2000, because it has sold the power plants served by the rail cars. UNICOM reported direct emission reductions of 14,302 metric tons carbon dioxide in 1999.

Indirect reductions of emissions in 2000 totaling 115,857 metric tons carbon dioxide equivalent were also reported for 28 projects. The sources of the reductions included “fuel cycle” emissions associated with production, refining, transportation, and distribution of fossil fuels; customer-owned natural gas vehicles refueled by natural gas distribution companies; employee vehicles affected by reporter-sponsored travel reduction programs, such as carpooling; and railroad-owned locomotives hauling coal in lightweight aluminum rail cars

owned by electric utilities. Indirect reductions from transportation projects reported in 2000 also declined significantly from those reported for 1999, primarily due to the absence of 2000 reductions for three projects for which reductions totaling 158,961 metric tons carbon dioxide were reported last year.³⁵

Reductions reported on Form EIA-1605EZ, which are not specified as direct or indirect, increased from 1,873 metric tons carbon dioxide equivalent for 1999 to 2,064 metric tons carbon dioxide equivalent for 2000. Most of the increase can be attributed to increased activity in employee travel reduction programs reported by Salt River Project and to new car-pooling and mass transit

Table 12. Number of Projects and Emission Reductions Reported for Transportation Projects by Project and Reduction Type, Data Years 1994-2000

Year	Number of Projects				Emission Reductions (Metric Tons Carbon Dioxide Equivalent)		
	Vehicle Efficiency	Travel Reduction	Alternative Fuels	Total	Direct	Indirect	Unspecified ^a
1994	4 ^(R)	6 ^(R)	22	31 ^(R)	4,203	6,346	10,398
1995	6	17 ^(R)	26	48 ^(R)	22,660	54,061	9,943
1996	7	18	34	58	28,813	54,043	12,144
1997	9	22	34	64	32,283	95,782	14,121
1998	9	30	35	72	25,085	89,174	16,518
1999	10 ^(R)	32	34	73	43,499	282,257	1,873
2000	8	34	32	72	21,911	115,857	2,064

^aUnspecified reductions represent quantities reported on Form EIA-1605EZ, which does not distinguish between direct and indirect emission reductions.

(R) = revised.

Note: Project and emission reduction totals may not equal sum of components because projects may be counted in more than one category.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

Table 13. Emission Reductions Reported for Transportation Projects by Project and Reduction Type, Data Years 1994-2000
(Metric Tons Carbon Dioxide Equivalent)

Year	Vehicle Efficiency			Travel Reduction			Alternative Fuels		
	Direct	Indirect	Unspecified ^a	Direct	Indirect	Unspecified ^a	Direct	Indirect	Unspecified ^a
1994	1,244	5,651	3	1,170	—	—	1,956	695	10,395
1995	18,148	36,137	—	2,179	16,461	1,345	2,463	1,495	8,599
1996	18,647	38,602	—	5,427	13,903	1,165	4,847	1,546	10,979
1997	20,989	48,213	—	8,753	45,227	225	2,582	2,352	13,897
1998	18,436	70,527	—	3,110	15,923	1,597	3,632	2,746	14,921
1999 ^(R)	14,671	173,296	—	6,077	106,841	1,824	22,866	2,148	49
2000	53	47,665	—	8,549	67,404	2,038	13,322	2,306	26

^aUnspecified reductions represent quantities reported on Form EIA-1605EZ, which does not distinguish between direct and indirect emission reductions.

(R) = revised.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

³⁵These projects were reported by three separate reporters last year. In this year's reporting cycle, one reporter did not submit a 2000 report; another did not submit its report in time to be included in the 2000 database, and a third declined to report emission reductions for a project because it lacked confidence in the data available to estimate reductions.

projects reported by Arizona Electric Power Cooperative, Inc., and Majestic Metals, Inc.

Using Alternative Fuels

Nearly half (44 percent) of the transportation projects reported for 2000 involved AFVs. These projects accounted for 61 percent of reported direct reductions but only 2 percent of reported indirect reductions. In general, the reported reductions for AFV projects were small, with reductions in excess of 1,000 metric tons carbon dioxide equivalent being reported for only three projects. All the AFV projects reported for 2000 were reported in previous years, with the exception of a compressed natural gas (CNG) vehicle project reported by PECO Energy.

AFV projects involved a variety of fuels, including natural gas, electricity, propane, and E-85 (a blend of 85 percent ethanol and 15 percent gasoline). CNG, included in 16 project reports, was the most common. Five utilities reported operating fleets of CNG or dual-fuel CNG/gasoline vehicles of more than 100 vehicles in 2000: Wisconsin Electric Power Company (874 vehicles), PG&E Corporation (501 vehicles), NiSource (600 vehicles), TXU (221 vehicles), and Baltimore Gas & Electric (163 vehicles).

Fifteen projects involved the operation of electric vehicles. Southern California Edison's electric vehicles reportedly logged over 1.9 million miles in 2000, more than 10 times the 174,000 miles reported in 1996. The Los Angeles Department of Water and Power (LADWP) reported operating 117 electric vehicles in 2000, up from 18 in 1996. Southern Company reported expansion of its electric vehicle fleet in 2000 to 484 vehicles, including cars, trucks, neighborhood electric vehicles, and buses.

Three AFV projects reported for 2000 involved fuels other than natural gas and electricity. Commonwealth Edison Company reported using E-85 and also the continued use of the 82 Dodge Neons that it converted to run on propane in 1999. Cinergy Corp. and TXU also reported the use of AFVs fueled by propane.

Reducing Vehicle Travel

Travel reduction, which includes such activities as car pooling and van pooling, mass transit, telecommuting, and service efficiency improvements, was reported for 34 projects in 2000—accounting for 39 percent of the direct reductions, 58 percent of the indirect reductions, and 99 percent of the unspecified reductions reported for transportation projects in 2000. Three new projects were reported, by Arizona Electric Power Cooperative, Inc. (car pooling); Baltimore Gas and Electric Company (compressed and flexible schedules, telecommuting,

and incentives to use mass transit); and Tucson Electric Power Company (car pooling, van pooling, mass transit, walking, bicycling, telecommuting, and compressed schedules).

Of the 34 projects reported in this category, 17 involved car pooling or van pooling, 12 increased mass transit ridership, 6 reduced employee vehicle use through telecommuting, 2 increased service efficiency for freight or service vehicles, and 13 involved other actions, such as work week compression, videoconferencing, and use of bicycles for commuting and utility meter reading.³⁶

The largest travel reduction project was reported by Quad/Graphics for a project that uses its delivery vehicles to pick up raw materials and supplies on return trips. Quad/Graphics estimates that the project reduced carbon dioxide emissions by 26,674 metric tons in 2000. Reductions of more than 5,000 metric tons carbon dioxide equivalent were also reported for the following travel reduction projects:

- Quad/Graphics reported moving to 12-hour work shifts at its printing plants (11,163 metric tons of indirect reductions).
- LADWP reported on its employee car pooling and van pooling program (7,086 metric tons of indirect reductions).
- TXU reported efforts to reduce fleet vehicle use (8,360 metric tons of direct reductions and 2,114 metric tons of indirect reductions).
- Public Service Enterprise Group reported on its employee car pooling, van pooling, and mass transit programs (7,023 metric tons of indirect reductions).
- CLE Resources reported its investment, through the Edison Electric Institute's EnviroTech investment fund, in McHugh Software, a company that developed software to improve routing for service vehicles (5,596 metric tons of indirect reductions).

Improving Vehicle Efficiency

Emission reductions were reported for only five of the seven vehicle efficiency projects reported for 2000. The two projects for which direct reductions were reported had modest effects on emissions, with the reported reductions totaling 53 metric tons carbon dioxide equivalent. In contrast, the indirect reductions for the two other projects reported, both of which involved the use of light-weight aluminum railroad cars to transport coal, were among the three largest reductions reported for transportation projects in 2000, totaling 46,151 metric tons carbon dioxide.

³⁶The total number of travel reduction projects is less than the sum of the projects in each subcategory because some individual projects include activities in more than one subcategory.

Three Midwestern utilities reported the use of aluminum railroad cars to transport coal to their plants. Ameren Corporation and Western Resources reported indirect reductions of carbon dioxide emissions in 2000 totaling 27,947 and 18,204 metric tons, respectively. Although Commonwealth Edison Company reported on its past use of aluminum railroad cars, no reductions were reported for 2000, because the plants served by the railroad cars have been sold. CLE Resources, a

subsidiary of Cleco Corporation, continued to report its investment (through the EnviroTech fund established by the Edison Electric Institute) in a company that developed and commercialized a device for monitoring and adjusting tire pressure on trucks to achieve optimal fuel efficiency. CLE Resources did not report emission reductions for this project, due to the unavailability of reliable data on the number of devices sold.

